

What is Claimed is:

- 1 1. A medical storage device for visually indicating a temperature of a medical
2 item contained therein comprising:
3 a receptacle for containing said medical item having a particular temperature range
4 for utilization; and
5 a temperature sensor disposed in thermal relation with said medical item and
6 including a plurality of temperature sensitive substances each associated with a
7 corresponding temperature range within an overall range of 50° F - 150° F , wherein each
8 said substance is responsive to a temperature of said medical item and provides a visual
9 indication of said item temperature when said item temperature is within said corresponding
10 temperature range.
- 1 2. The medical storage device of claim 1 wherein said temperature sensor
2 includes a temperature sensing strip providing a digital indication of said medical item
3 temperature.
- 1 3. The medical storage device of claim 1 wherein said receptacle includes an
2 intravenous solution bag and said medical item includes an intravenous solution.
- 1 4. The medical storage device of claim 3 wherein said temperature sensor is
2 laminated to said intravenous solution bag.
- 1 5. The medical storage device of claim 3 wherein said intravenous solution bag
2 is encased in a liner, and said temperature sensor is disposed between said liner and said
3 intravenous solution bag.
- 1 6. The medical storage device of claim 1 wherein said receptacle includes a
2 bottle.

1 7. The medical storage device of claim 6 wherein said bottle includes a label and
2 said temperature sensor is affixed to said label.

1 8. The medical storage device of claim 2 wherein said medical item includes an
2 intravenously delivered fluid, and said receptacle includes a fluid delivery tube of an infusion
3 system for providing said medical fluid to a patient.

1 9. The medical storage device of claim 1 wherein said medical item includes an
2 intravenously delivered fluid, and said receptacle includes a holder of an infusion system for
3 receiving a medical container of said intravenously delivered fluid and suspending said
4 container from a support structure to facilitate infusion of said intravenously delivered fluid
5 to a patient.

1 10. The medical storage device of claim 1 wherein:
2 said medical storage device is a thermal treatment system for thermally treating
3 medical objects placed therein;
4 said medical item includes a medical fluid and said receptacle includes a plurality of
5 thermal treatment system compartments each for receiving a medical container having said
6 medical fluid contained therein; and
7 said medical storage device further includes a plurality of said temperature sensors,
8 wherein each temperature sensor is disposed within a corresponding compartment in thermal
9 relation with an associated medical container placed in that compartment and provides a
10 visual temperature indication of medical fluid within said associated medical container.

1 11. A medical device for visually indicating a temperature of a medical item
2 placed therein comprising:
3 a receptacle for receiving and securing said medical item within said device, wherein
4 said medical item has a particular temperature range for utilization; and
5 a temperature sensor disposed within said receptacle in thermal relation with said
6 medical item and providing a visual indication of medical item temperature;

7 wherein said receptacle is configured to force said medical item against said
8 temperature sensor to facilitate temperature measurement.

1 12. The medical device of claim 11 wherein said temperature sensor includes a
2 plurality of temperature sensitive substances each associated with a corresponding
3 temperature range, wherein each said substance is responsive to a temperature of said
4 medical item and provides a visual indication of said medical item temperature when said
5 medical item temperature is within said corresponding temperature range.

1 13. The medical device of claim 12 wherein said temperature sensor includes a
2 temperature sensing strip providing a digital indication of said medical item temperature.

1 14. The medical device of claim 11 further including:
2 a base;
3 a display panel attached to said base and having said temperature sensor disposed on
4 an interior surface thereof;
5 an item support attached to said base and displaced from said display panel to form
6 said receptacle therebetween, wherein said display panel and item support secure said
7 medical item within said receptacle and force said medical item against said temperature
8 sensor; and
9 a device support attached to said item support and said base for reinforcing said
10 medical device.

1 15. The medical device of claim 14 wherein said display panel further includes a
2 handle to facilitate transport and handling of said medical device.

1 16. The medical device of claim 11 further including:
2 a base; and
3 a securing member attached to said base and including said temperature sensor
4 disposed on an interior surface thereof, wherein said securing member and said base form
5 said receptacle therebetween, and wherein said securing member is configured to contour and

6 secure said medical item within said receptacle and force said temperature sensor against said
7 medical item to facilitate temperature measurement.

1 17. The medical device of claim 11 wherein said medical device is attached to a
2 support structure.

1 18. The medical device of claim 11 wherein said medical device is attached to a
2 thermal treatment system.

1 19. The medical device of claim 11 wherein said temperature sensor includes a
2 liquid crystal display.

1 20. The medical device of claim 11 wherein said temperature sensor includes a
2 voice synthesizer to provide an audio indication of said medical item temperature.

1 21. The medical device of claim 11 wherein said temperature sensor includes an
2 infra-red temperature sensor.

1 22. An apparatus for facilitating pressurized infusion of liquid from a liquid-filled
2 container through a tube into a patient wherein said liquid-filled container is suspended from
3 a support and said tube extends between said liquid-filled container and said patient, said
4 apparatus comprising:

5 an inflatable pressure device for applying pressure to said liquid-filled container to
6 facilitate flow of liquid from said liquid-filled container through the tube to the patient;

7 a receptacle for engaging said support and receiving said liquid-filled container and
8 said inflatable pressure device, wherein said receptacle includes a temperature sensor for
9 providing a visual temperature indication of said liquid, and wherein said inflatable pressure
10 device is disposed within said receptacle adjacent said liquid-filled container; and

11 a pressure controller for regulating fluid pressure within and expansion of said
12 inflatable pressure device to control pressure applied by said inflatable pressure device to

13 said liquid-filled container to generate a desired liquid flow rate from said liquid-filled
14 container to the patient.

1 23. The apparatus of claim 22 further including:
2 a heating element to heat said liquid-filled container; and
3 a conductive plate to apply heat from said heating element to said liquid-filled
4 container;
5 wherein said pressure device is disposed within a bag having a pocket for receiving
6 said heating element and said conductive plate such that said conductive plate is disposed
7 between said liquid-filled container and said heating element to apply heat from said heating
8 element to said liquid-filled container.

1 24. The apparatus of claim 22 wherein said temperature sensor includes a
2 plurality of temperature sensitive substances each associated with a corresponding
3 temperature range, wherein each said substance is responsive to a temperature of said liquid
4 and provides a visual indication of said liquid temperature when said liquid temperature is
5 within said corresponding temperature range.

1 25. The apparatus of claim 24 wherein said temperature sensor includes a
2 temperature sensing strip providing a digital indication of said liquid temperature.

1 26. A temperature control system for heating medical items to desired
2 temperatures comprising:
3 a system housing;
4 a heating chamber disposed within said housing for receiving at least one medical
5 item and heating said at least one medical item to a desired temperature, wherein said heating
6 chamber includes:
7 at least one receptacle each for receiving a corresponding medical item and
8 heating said corresponding medical item to said desired temperature;
9 a temperature sensor disposed in each receptacle in thermal relation with and
10 for providing a temperature indication of a corresponding medical item; and

11 a heater for applying heat to said receptacle; and
12 a controller to facilitate entry of said desired temperature for said heating chamber
13 and to control said heater to heat said at least one medical item to said desired temperature.

1 27. The system of claim 26 wherein said temperature sensor includes a plurality
2 of temperature sensitive substances each associated with a corresponding temperature range,
3 wherein each said substance is responsive to a temperature of said medical item and provides
4 a visual indication of said medical item temperature when said medical item temperature is
5 within said corresponding temperature range.

1 28. The system of claim 27 wherein said temperature sensor includes a
2 temperature sensing strip providing a digital indication of said medical item temperature.

1 29. A method of visually indicating a temperature of a medical item contained in
2 a medical storage device comprising the steps of:

3 (a) containing said medical item in a medical storage device receptacle, wherein
4 said medical item has a particular temperature range for utilization; and

5 (b) measuring and providing a visual indication of temperature of said medical
6 item within said receptacle via a temperature sensor disposed in thermal relation with said
7 medical item and including a plurality of temperature sensitive substances each associated
8 with a corresponding temperature range within an overall range of 50° F - 150° F, wherein
9 each said substance is responsive to a temperature of said medical item and provides said
10 visual indication when said medical item temperature is within said corresponding
11 temperature range.

1 30. The method of claim 29 wherein said temperature sensor includes a
2 temperature sensing strip, and step (b) further includes:

3 (b.1) measuring said medical item temperature and providing a digital indication of
4 said measured temperature via said temperature sensing strip.

1 31. The method of claim 29 wherein said receptacle includes an intravenous
2 solution bag and said medical item includes an intravenous solution, and step (a) further
3 includes:

4 (a.1) containing said intravenous solution within said intravenous solution bag.

1 32. The method of claim 31 wherein step (b) further includes:

2 (b.1) laminating said temperature sensor to said intravenous solution bag.

1 33. The method of claim 31 wherein step (b) further includes:

2 (b.1) encasing said intravenous solution bag in a liner and disposing said
3 temperature sensor between said liner and said intravenous solution bag.

1 34. The method of claim 29 wherein said receptacle includes a bottle, and step (a)
2 further includes:

3 (a.1) containing said medical item within said bottle.

1 35. The method of claim 34 wherein said bottle includes a label, and
2 step (b) further includes:

3 (b.1) affixing said temperature sensor to said label.

1 36. The method of claim 30 wherein said medical item includes an intravenously
2 delivered fluid and said receptacle includes a fluid delivery tube of an infusion system for
3 providing said medical fluid to a patient, and step (a) further includes:

4 (a.1) containing said intravenously delivered fluid within said fluid delivery tube.

1 37. The method of claim 29 wherein said medical item includes an intravenously
2 delivered fluid and said receptacle includes a holder of an infusion system for receiving a
3 medical container of said intravenously delivered fluid and suspending said container from a
4 support structure to facilitate infusion of said intravenously delivered fluid to a patient, and
5 step (a) further includes:

6 (a.1) containing said medical container of said intravenously delivered fluid within
7 said holder.

1 38. The method of claim 29 wherein said medical storage device is a thermal
2 treatment system for thermally treating medical objects placed therein, said medical item
3 includes a medical fluid and said receptacle includes a plurality of thermal treatment system
4 compartments each for receiving a medical container having said medical fluid contained
5 therein, said medical storage device further including a plurality of said temperature sensors,
6 and step (b) further includes:
7 (b.1) placing each temperature sensor within a corresponding compartment in
8 thermal relation with an associated medical container placed in that compartment and
9 providing a visual temperature indication of medical fluid within said associated medical
10 container.

1 39. A method of visually indicating a temperature of a medical item placed in a
2 medical device comprising the steps of:
3 (a) receiving and securing said medical item within a receptacle of said device,
4 wherein said medical item has a particular temperature range for utilization; and
5 (b) measuring and providing a visual indication of medical item temperature via a
6 temperature sensor disposed within said receptacle in thermal relation with said medical
7 item, wherein said receptacle is configured to force said medical item against said
8 temperature sensor to facilitate temperature measurement.

1 40. The method of claim 39 wherein said temperature sensor includes a plurality
2 of temperature sensitive substances each associated with a corresponding temperature range,
3 wherein each said substance is responsive to a temperature of said medical item, and step (b)
4 further includes:
5 (b.1) measuring and visually indicating said medical item temperature via each
6 temperature sensitive substance when said medical item temperature is within a
7 corresponding temperature range of that substance.

1 41. The method of claim 40 wherein said temperature sensor includes a
2 temperature sensing strip, and step (b.1) further includes:

3 (b.1.1) measuring said medical item temperature and providing a digital indication of
4 said measured temperature via said temperature sensing strip.

1 42. The method of claim 39 wherein said medical device includes a base, a
2 display panel, an item support displaced from said display panel to form said receptacle
3 therebetween and a device support to reinforce said medical device, and step (a) further
4 includes:

5 (a.1) securing said medical item within said receptacle via said display panel and
6 item support; and

7 step (b) further includes:

8 (b.1) placing said temperature sensor on an interior surface of said display panel and
9 forcing said medical item against said temperature sensor via said display panel and item
10 support to facilitate temperature measurement.

1 43. The method of claim 42 wherein said display panel further includes a handle, and
2 step (a) further includes:

3 (a.1) transporting and handling said medical device via said handle.

1 44. The method of claim 39 wherein said medical device further includes a base
2 and a securing member attached to said base, wherein said securing member and said base
3 form said receptacle therebetween, and step (b) further includes:

4 (b.1) placing said temperature sensor on an interior surface of said securing
5 member; and

6 (b.2) contouring and securing said medical item within said receptacle via said
7 securing member and forcing said temperature sensor against said medical item to facilitate
8 temperature measurement.

1 45. The method of claim 39 wherein step (a) further includes;

2 (a.1) attaching said medical device to a support structure.

- 1 46. The method of claim 39 wherein step (a) further includes:
- 2 (a.1) attaching said medical device to a thermal treatment system.